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13. A partial stroke testing system for testing of an emergency shut-off valve according to claim 1, which can be implemented as a portable and self contained test apparatus for conducting partial stroke test on shut-off valves controlled by a non-programmable shutdown system.

REMARKS

Applicant has cancelled claim 2 and rewritten claims 1, 3-5 and 7-13 in order to overcome the rejection under 35 USC 112, second paragraph. It is respectfully submitted that the revision of claim 1 properly corrects the elements. For example, the source of pressurized gas is functionally connected to a main solenoid valve and a quick exhaust valve. Also, the test means in line 12 has been eliminated since it is previously set forth in line 11.

In addition, claim 2 has been cancelled since it is redundant with claim 1. With respect to claim 6, claim 6 had previously been cancelled from the application.

Applicant is enclosing a marked-up copy of the claims and page 5 of the applicant's specification to show the changes. Since pressurized gas was called for in the original claims, no new matter has been added.

In view of the above changes, it is respectfully submitted that this application is now in condition for allowance. Prompt, favorable action is therefore requested.

Respectfully submitted,

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Date

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APPENDIX A

As disclosed herein, a partial stroke test system tests an emergency shut-off valve on-line, i.e. without shutting down the process, for free movement over a small portion of its full stroke. Therefore, tests can be performed at frequent intervals. By so doing, there is a high probability of ensuring the emergency shut-off valve's operability, which reduce the likelihood of failure of an emergency shut-off valve during extended runs.

In the oil, gas and petrochemical industries, emergency shut-off valves generally remain open while the process is in a safe and controlled state. These valves close only upon a plant trip, which arises from an out of control process. The emergency shut-off valve typically includes a pneumatic cylinder which drives an emergency shut-off valve into a fully closed position within about one second.

A partial stroke testing system 10, incorporated in a shut-off valve for use in the oil, gas, petrochemical and power industries is illustrated schematically in Figure 1. Such system is incorporated in an emergency shut-off valve 20 which remains in an open position during normal process conditions. Compressed air from a source 22 is used for maintaining the value 20 in an open position. The compressed air maintains the valve 20 in an open position by driving a spring biased piston actuator 24. The compressed air is connected with the spring biased actuator 24 through a main solenoid valve 26 and a quick exhaust valve 28. The source 22 of pressurized gas such as compressed air is connected to the main solenoid valve 26, quick exhaust valve 28 and actuator 24 by tubing 23, 25 and 27.

In the event of plant trip, i.e. an out of control process, a signal as for example from plant emergency shutdown system controller 30

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APPENDIX B

1. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve, said system implemented on an emergency shut-off valve normally movable between fully opened and fully closed position, said system comprising an emergency shut-off valve, control means for initiating an electrical signal for initiating a test on said emergency shut-off valve, a source of pressurized gas and means including a main solenoid responsive to a signal from said control means, a main solenoid valve and a quick exhaust valve connected to said source of pressurized gas and a pneumatic actuator for opening and closing the said shut-off valve, test means for testing [the] said emergency shut-off valve [test means for testing the said emergency shut-off valve] without fully closing [the] said emergency shut-off valve in response to a signal from said control means, said test means including a second solenoid, a second solenoid valve for bleeding off pressurized gas to thereby move said emergency shut-off valve from full opened position to a partially closed position, means for limiting the movement of said emergency shut-off valve to a partially closed position as a result of the bleeding off of pressurized gas and means for detecting actual movement of said emergency shut-off valve.

3. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim [2] 1 which includes an isolation valve between said second solenoid valve said pneumatic actuator for isolating the said second solenoid valve from the rest of the system.

4. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim 1, which includes a control sequence programmed into [the plant emergency shutdown system controller which acts as] said

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control means for initiating a partial stroke test on said shut-off valve.

5. A partial stroke testing system for online testing of an emergency shut-off valve according to claim 1, in which the means for detecting the movement of the said emergency shut-off valve is a limit switch.

7. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim [2] 1, which bleeds pressurized gas from [the shut-off valve] pneumatic actuator during partial stroke checking of emergency shut-off valve.

8. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim 4, in which backup means for terminating the partial stroke test is [the] a timer programmed [in to] into the [plant emergency shutdown] partial stroke testing system controller.

9. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim [2] 1 which bleeds pressurized air from the system during emergency closure (trip) of the said emergency shut-off valve to enhance the bleed rate and act as a backup to the main solenoid valve and quick exhaust valve in the event of unsafe failure to the said main solenoid valve and quick exhaust valve.

10. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim [2] 1 which includes means of monitoring the full stroke travel time of said emergency shut-off valve in the event of emergency closure of the said emergency shut-off valve as a result of a trip signal from [the plant emergency shutdown system controller] said control means.

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11. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim [2] 1, which includes means preventing inadvertent manual opening of the said emergency shut-off valve, subsequent emergency closure of the said emergency shut-off valve as a result of a trip signal from the [plant emergency shutdown system controller] control means and prior to reset of trip signal in the plant emergency shutdown system controller.

12. (Amended) A partial stroke testing system for online testing of an emergency shut-off valve according to claim [2] 1 which includes means for initiating partial stroke test manually or at programmed intervals from a computer interfaced to [plant emergency shutdown system controller] said control means and to generate printed report of test results.

13. (Amended) A partial stroke testing system for testing of an emergency shut-off valve according to claim [2] 1, which can be implemented as a portable and self contained test apparatus for conducting partial stroke test on shut-off valves controlled by a non-programmable shutdown system.

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As disclosed herein, a partial stroke test system tests an emergency shut-off valve on-line, i.e. without shutting down the process, for free movement over a small portion of its full stroke. Therefore, tests can be performed at frequent intervals. By so doing, there is a high probability of ensuring the emergency shut-off valve's operability, which reduce the likelihood of failure of an emergency shut-off valve during extended runs.

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In the event of plant trip i.e. an out of control process, a signal as for example from plant emergency shutdown system controller 30

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